ControlNet™

Interface for 520, 720i®, 820i® and 920i® Indicators

Installation and Programming Manual
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May 2010
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About This Manual

This manual provides information needed to install and use the Rice Lake Weighing Systems ControlNet Interface. The ControlNet Interface allows 520, 720i®, 820i®, and 920i® indicators to communicate with a master controller on a ControlNet network.¹ See the 520, 720i, 820i, or 920i Installation Manual for additional installation information and detailed descriptions of indicator functions.

The ControlNet Interface is installed inside the indicator enclosure. Installation in NEMA 4X stainless steel enclosures permits use in washdown environments.

Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at www.ricelake.com.

1. ControlNet™ is a trademark of ControlNet International.

1.0 Introduction

The ControlNet Interface returns weight and status information from a 520, 720i, 820i, or 920i indicator to a master controller and provides limited control of indicator functions to the programmer. Indicator configuration and calibration cannot be performed through the ControlNet Interface.

The ControlNet Interface functions as a Communications Adapter Device (profile 12) on a ControlNet network. It acts as a group-two-only server on the network. At this time only one polled I/O connection is supported.

The master controller sends commands to the indicator through the ControlNet Interface by writing the commands in the output command format. The ControlNet Interface returns the weight and status data in the input command format. These actions are referred to as polled I/O. See Section 3.0 for descriptions of the polled I/O commands.
2.0 Installation

The ControlNet Interface hardware consists of a dual-board option card. ControlNet-specific functions are provided by a ControlNet module, which is factory-installed onto a bus adapter card. The bus adapter card plugs into an open option card slot on the 520, 820i, or 920i CPU board (or expansion board) and provides power and access from the indicator bus to the ControlNet module.

This section describes the procedures used to install the ControlNet Interface into the 520, 820i, and 920i indicators, connect communications cables, and set the ControlNet address DIP switches on the module.

2.1 Installing the ControlNet Interface

Use the following procedure to install the ControlNet Interface into 520, 820i, and 920i indicators.

2.1.1 Installing ControlNet Option in the 820i or 920i

Use the following procedure to install the ControlNet Interface in the 720i, 820i or 920i indicator:

1. Disconnect indicator from power source.
   
   Disconnect power before removing indicator backplate.

   Warning: The 720i, 820i and 920i have no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.

2. Open indicator enclosure. For indicator models with backplates, place indicator face-down on an antistatic work mat. Remove screws that hold the backplate to the enclosure body.

   Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.

3. Carefully align the large connector (J1) on the bus adapter card with connector J12 on the 720i, J6 on the 820i, or J5 on the 920i CPU board (see Figure 2-1). Press down to seat the bus adapter card in the CPU board connector.

4. Use the screws and lockwashers provided in the option kit to secure the other end of the option card to the threaded standoffs on the CPU board.

5. Wire the card to the network as described in Section 2.2 on page 3.

6. Set DIP switch as described in Section 2.3 on page 3.

7. Use cable ties to secure loose cables inside the enclosure.

8. For indicator models that include a backplate, position the backplate over the enclosure and reinstall the backplate screws. For the 820i or 920i universal models, use the torque pattern shown in Figure 2-2 to prevent distorting the backplate gasket. Torque screws to 15 in-lb (1.7 N-m).

9. Ensure no excess cable is left inside the enclosure and tighten cord grips.

10. Reconnect power to the indicator. The indicator automatically recognizes all installed option cards when the unit is powered on. No hardware-specific configuration is required to identify the newly-installed ControlNet Interface to the system.
2.1.2 Installing ControlNet Option in the 520

Use the following procedure to install the ControlNet Interface in the 520 indicator:

1. Disconnect indicator from power source. 

   **Warning**
   
   Disconnect power before removing indicator enclosure cover.
   
   The 520 has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.

2. Place indicator on an antistatic work mat. Remove screws that hold the enclosure cover to the enclosure body.

   **Caution**
   
   Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.

3. Carefully align the large option card connector with connector J2 on the CPU board. Press down to seat the option card in the CPU board connector.

4. Use screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the CPU board.

5. Route cables through cover supplied with the option kit.

6. Reconnect power to the indicator.

7. The indicator automatically recognizes all installed option cards when the unit is powered on. No hardware-specific configuration is required to identify the newly-installed ControlNet interface to the system.

2.2 ControlNet Network Connections

The ControlNet module includes the following connectors:

- Network Access Port (NAP), for temporary diagnostic or configuration access
- Two BNC connectors for ControlNet Channels A and B

Feed ControlNet network cables through cord grip (720i, 820i and 920i) or through the special cover supplied for the 520. Allow enough cable for routing along inside of enclosure to connector on the ControlNet module. Connect network cables to connector on the ControlNet module (see Figure 2-3), then use cable ties to secure network cables to the cable tie mounts.

2.3 Address and Termination Switches

The ControlNet Interface address is set using switches on the Profibus module. Figure 2-4 shows the address and termination switches.

**Address Switches**

Two rotary switches are used to set the decimal node address, 1–99, of the ControlNet Interface (use Address 0 if configuring the address in software.) Note that the node address cannot be changed during operation.

The left switch shown in Figure 2-4, marked $x_{10}$, sets the tens digit; the right switch, $x_{1}$, sets the units digit. (For example, to set a decimal address of 14, set $x_{10} = 1$, and $x_{1} = 4$.)
### 2.4 LED Status Indicators

An LED array on the ControlNet module provides status information for troubleshooting. LED 1 provides module status; LED 2 provides status information for both Channel A and B; LED 3 provides status information that can apply to either channel; LED 4 indicates the presence of a network connection to the module.

Table 2-1 on page 4 summarizes the function of the module and network status LEDs.

![ControlNet Status LED Module](image)

#### Table 2-1. Module and Network Status LED Indications

<table>
<thead>
<tr>
<th>LED</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED 1 Module Status</td>
<td>Steady Green</td>
<td>Connection in run state</td>
</tr>
<tr>
<td></td>
<td>Flashing Green</td>
<td>Connecting, connection idle</td>
</tr>
<tr>
<td></td>
<td>Steady Red</td>
<td>Major fault</td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>Minor fault</td>
</tr>
<tr>
<td>LED 2 Channel A and B</td>
<td>Off</td>
<td>Module not initialized</td>
</tr>
<tr>
<td></td>
<td>Steady Red</td>
<td>Major fault</td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>Node configuration error</td>
</tr>
<tr>
<td></td>
<td>Alternating Red/Green</td>
<td>Self-test</td>
</tr>
<tr>
<td>LED 3 Channel A or B</td>
<td>Off</td>
<td>Channel disabled</td>
</tr>
<tr>
<td></td>
<td>Steady Green</td>
<td>Normal channel operation</td>
</tr>
<tr>
<td></td>
<td>Flashing Green</td>
<td>Temporary error (node will self-correct) or not configured</td>
</tr>
<tr>
<td></td>
<td>Flashing Red</td>
<td>No other nodes, or media fault</td>
</tr>
<tr>
<td></td>
<td>Alternating Red/Green</td>
<td>Network configuration error</td>
</tr>
<tr>
<td>LED 4 Module Owned</td>
<td>Off</td>
<td>No connection opened</td>
</tr>
<tr>
<td></td>
<td>Steady Green</td>
<td>Connection opened</td>
</tr>
</tbody>
</table>

A single bi-color watchdog LED on the surface of the ControlNet module provides diagnostic information for debugging the module itself. Table 2-2 lists the indications provided by the debugging LED.

#### Table 2-2. Debugging LED Indications

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No power</td>
</tr>
<tr>
<td>Red, 4Hz</td>
<td>DPRAM check fault</td>
</tr>
<tr>
<td>Red, 2Hz</td>
<td>ASIC and FLASH ROM check fault</td>
</tr>
<tr>
<td>Red, 1Hz</td>
<td>RAM check fault</td>
</tr>
<tr>
<td>Green, 2Hz</td>
<td>Module not initialized</td>
</tr>
<tr>
<td>Green, 1Hz</td>
<td>Module initialized and running</td>
</tr>
</tbody>
</table>

---

ControlNet Installation and Programming Manual
3.0 Commands

Commands are used by the ControlNet master device to send and receive data from the ControlNet Interface as integer or floating-point data. The master sends eight bytes in the output format (used to write commands to the indicator) and reads eight bytes in the input format (used to read data from the indicator).

**Decimal Point Handling**

Integer commands return no decimal point information to the master. For example, a value of 750.1 displayed on the indicator is returned to the master as 7501. Floating point commands support decimal point information with no special handling.

3.1 Output Command Format

To perform a command, the master uses the output command format to send four 16-bit words to the ControlNet Interface. These four words contain the command and any parameters necessary to execute it. The output command format is shown in Table 3-1.

<table>
<thead>
<tr>
<th>Word</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word 1</td>
<td>Command number</td>
</tr>
<tr>
<td>Word 2</td>
<td>Parameter</td>
</tr>
<tr>
<td>Word 3</td>
<td>Value (MSW)</td>
</tr>
<tr>
<td>Word 4</td>
<td>Value (LSW)</td>
</tr>
</tbody>
</table>

**Table 3-1. Output Command Format**

The contents of each output command format word are described below:

**Command number**

The number representing the indicator command is sent in the first word. Table 3-2 lists the commands that can be specified for 520, 820i, and 920i indicators.

**NOTE:** A lockout feature that looks for any change in the output format data is incorporated into the indicator receive mechanism to prevent inundation by the same command. Repeated commands must be separated by any other valid command/parameter/value combination.

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Hex</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0x000</td>
<td>Return Status and Weight (integer)</td>
</tr>
<tr>
<td>1</td>
<td>0x001</td>
<td>Display Channel</td>
</tr>
<tr>
<td>2</td>
<td>0x002</td>
<td>Display Gross Weight</td>
</tr>
<tr>
<td>3</td>
<td>0x003</td>
<td>Display Net Weight</td>
</tr>
<tr>
<td>4</td>
<td>0x004</td>
<td>Display Count</td>
</tr>
<tr>
<td>9</td>
<td>0x009</td>
<td>Gross/Net key press (toggle)</td>
</tr>
<tr>
<td>10</td>
<td>0x00A</td>
<td>Zero</td>
</tr>
<tr>
<td>11</td>
<td>0x00B</td>
<td>Display Tare</td>
</tr>
</tbody>
</table>

**Table 3-2. 520/720i/820i/920i Remote Commands**
To allow communication with a multi-scale indicator, the scale number is sent in the second word of the output command format. Zero (0) represents the current scale. Certain commands require a parameter other than a scale number, such as a slot number, setpoint number, or other selection parameter. See the command descriptions in Section 3.3 for specific command requirements.

**Value**

The third and fourth words of the output format are used to pass value data on certain commands. Values entered in these words are treated as unsigned long integers or floating-point values, depending on the command.

### 3.2 Input Command Format

In response to a command, the ControlNet Interface returns data and status information to the master as four 16-bit words. This information is returned in the input command format shown in Table 3-3.

The value type can be set for those commands that do not specify integer or floating point data by sending a command 0x000 to specify integer data or command 0x100 for floating-point data. The value type is returned in the status word (bit 14) of the input format.

<table>
<thead>
<tr>
<th>Command number</th>
<th>The first word echoes the command number. If the command fails or is not recognized, the negative of the command number is returned to signal the error.</th>
</tr>
</thead>
</table>

**Status Data**

Indicator status data is returned in the second word (see Table 3-4). Batch commands return batch status in place of the low byte (see Table 3-5). Setpoint commands return batch status in the low byte of the status word and the setpoint number in the high byte.

<table>
<thead>
<tr>
<th>Word 2</th>
<th>Batch Function Status Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit</td>
<td>Value=0</td>
</tr>
<tr>
<td>00</td>
<td>Digital input 4 OFF (520) Error</td>
</tr>
<tr>
<td>01</td>
<td>Digital input 3 OFF</td>
</tr>
<tr>
<td>02</td>
<td>Digital input 2 OFF</td>
</tr>
<tr>
<td>03</td>
<td>Digital input 1 OFF</td>
</tr>
<tr>
<td>04</td>
<td>Batch not paused</td>
</tr>
<tr>
<td>05</td>
<td>Batch not running</td>
</tr>
<tr>
<td>06</td>
<td>Batch not stopped</td>
</tr>
<tr>
<td>07</td>
<td>Alarm OFF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word 3</th>
<th>Value (MSW)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Word 4</th>
<th>Value (LSW)</th>
</tr>
</thead>
</table>

---

Table 3-3. Input Command Format

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Hex</th>
<th>Command Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>295</td>
<td>0x127</td>
<td>Read Rate of Change (float)</td>
</tr>
<tr>
<td>296</td>
<td>0x128</td>
<td>Read Peak (float)</td>
</tr>
<tr>
<td>304</td>
<td>0x130</td>
<td>Set Setpoint Value (float)</td>
</tr>
<tr>
<td>305</td>
<td>0x131</td>
<td>Set Setpoint Hysteresis (float)</td>
</tr>
<tr>
<td>306</td>
<td>0x132</td>
<td>Set Setpoint Bandwidth (float)</td>
</tr>
<tr>
<td>307</td>
<td>0x133</td>
<td>Set Setpoint Preact (float)</td>
</tr>
<tr>
<td>320</td>
<td>0x140</td>
<td>Read Setpoint Value (float)</td>
</tr>
<tr>
<td>321</td>
<td>0x141</td>
<td>Read Setpoint Hysteresis (float)</td>
</tr>
<tr>
<td>322</td>
<td>0x142</td>
<td>Read Setpoint Bandwidth (float)</td>
</tr>
<tr>
<td>323</td>
<td>0x143</td>
<td>Read Setpoint Preact (float)</td>
</tr>
<tr>
<td>368</td>
<td>0x170</td>
<td>Set Register</td>
</tr>
<tr>
<td>402</td>
<td>0x192</td>
<td>Get Register</td>
</tr>
</tbody>
</table>

Table 3-4. Indicator Status Data Format

<table>
<thead>
<tr>
<th>Word 2</th>
<th>Indicator Status Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit</td>
<td>Value=0</td>
</tr>
<tr>
<td>00</td>
<td>Error</td>
</tr>
<tr>
<td>01</td>
<td>Tare not entered</td>
</tr>
<tr>
<td>02</td>
<td>Not zero</td>
</tr>
<tr>
<td>03</td>
<td>Weight invalid</td>
</tr>
<tr>
<td>04</td>
<td>Standstill</td>
</tr>
<tr>
<td>05</td>
<td>Primary units</td>
</tr>
<tr>
<td>06</td>
<td>Tare not acquired</td>
</tr>
<tr>
<td>07</td>
<td>Gross weight</td>
</tr>
<tr>
<td>08</td>
<td>Channel number</td>
</tr>
<tr>
<td>09</td>
<td>(NOTE: Value 0 represents scale #32)</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>14</td>
<td>Integer data</td>
</tr>
<tr>
<td>15</td>
<td>Positive weight</td>
</tr>
</tbody>
</table>

Table 3-5. Batch Function Status Data Format
Value
Weight data is returned to the master in the third and fourth words of the input command format, depending on the command and the value type. The weight data returned is the displayed weight after the command is executed, unless the command specifies otherwise.

3.3 Command Descriptions

NOTE: For all commands that require a scale number, a value of 0 indicates the current scale. Unless otherwise specified, the indicator returns weight and status data for the specified scale.

Return Status and Current Weight as Integer
Command: 0, 0x000
Parameter: Scale number
Command 0 returns the status and weight of the specified scale in integer format, without changing the display. This command also causes the format-independent commands to return a value in the integer format.

Display Channel
Command: 1, 0x001
Parameter: Scale number
Command 1 causes the weight of the specified scale to be displayed and returned in its current mode and format. This command is valid for the 920i only.

Display Gross Weight
Command: 2, 0x002
Parameter: Scale number
Command 2 causes the gross weight of the specified scale to be displayed and returned.

Display Net Weight
Command: 3, 0x003
Parameter: Scale number
Command 3 causes the net weight of the specified scale to be displayed and returned.

Display Piece Count
Command: 4, 0x004
Parameter: Scale number
Command 4 causes the piece count on the specified scale to be displayed and returned. This command is valid only for the 520 indicator, and only if count mode is enabled.

Gross/Net Key Press (toggle mode)
Command: 9, 0x009
Parameter: Scale number
Command 9 toggles between gross and net mode (and count mode, if enabled). If a scale number other than 0 is specified, the action may not be evident until the specified scale is displayed.

Zero
Command: 10, 0x00A
Command 10 performs a zero operation on the current scale.

Display Tare
Command: 11, 0x00B
Parameter: Scale number
Command 11 causes the tare weight on the specified scale to be displayed. If a scale number other than 0 is specified, the indicator first causes the specified scale to be displayed. The tare data continues being returned even if the display times out and returns to another mode.

Enter Tare (integer)
Command: 12, 0x00C
Parameter: Scale number
Value: Tare weight
Command 12 enters a tare for the scale selected. Tare data must be in integer format. The indicator continues to return weight data in the current mode for the specified scale.

Acquire Tare (simulate TARE key press)
Command: 13, 0x00D
Parameter: Scale number
Command 13 acquires a tare based on the weight currently on the specified scale. The indicator continues to return weight data in the current mode for the specified scale.

Clear Tare
Command: 14, 0x00E
Parameter: Scale number
Command 14 clears the tare for the specified scale. The indicator continues to return weight data in the current mode for the specified scale.

Primary Units
Command: 16, 0x010
Parameter: Scale number
Command 16 switches the current format of the specified scale to the primary units configured for that scale.

Secondary Units
Command: 17, 0x011
Parameter: Scale number
Command 17 switches the current format of the specified scale to the secondary units configured for that scale.
Tertiary Units
Command: 18, 0x012
Parameter: Scale number
Command 18 switches the current format of the specified scale to the tertiary units configured for that scale, if available. This command is valid for the 720i, 820i or 920i only.

Units Key Press (toggle units)
Command: 19, 0x013
Parameter: Scale number
Command 19 toggles the current format of the specified scale to the next units configured for that scale, as available.

Print Request
Command: 20, 0x014
Parameter: Scale number
Command 20 causes the indicator to execute a print command for the current scale.

Display Accumulator
Command: 21, 0x015
Parameter: Scale number
Command 21 causes the value of the accumulator for the specified scale to be displayed and returned. This command is only valid if the accumulator for the specified scale is enabled.

Clear Accumulator
Command: 22, 0x016
Parameter: Scale number
Command 22 clears the value of the accumulator for the specified scale. This command is only valid if the accumulator for the specified scale is enabled.

Push Weight to Accumulator
Command: 23, 0x017
Parameter: Scale number
Command 23 adds the net weight on the specified scale to the value of the accumulator for the specified scale. The scale must return to net zero between accumulations. The indicator returns the accumulated weight data for the specified scale. This command is only valid if the accumulator for the specified scale is enabled.

Return Net as Integer
Command: 33, 0x021
Parameter: Scale number
Command 33 returns the net weight value for the specified scale as an integer.

Return Tare as Integer
Command: 34, 0x022
Parameter: Scale number
Command 34 returns the tare weight value for the specified scale as an integer.

Return Piece Count
Command: 35, 0x023
Parameter: Scale number
Command 35 returns the piece count value for the specified scale. This command is valid only for the 520 indicator, and only if count mode is enabled.

Return Current Display as Integer
Command: 37, 0x025
Parameter: Scale number
Command 37 returns the weight value for the specified scale as currently displayed. This may include gross, net, tare, piece count, or accumulator values, as enabled. On the 820i and 920i, the weight value is returned in the mode used to display a scale widget.

Return Accumulator as Integer
Command: 38, 0x026
Parameter: Scale number
Command 38 returns the accumulator value for the specified scale. This command is only valid if the accumulator for the specified scale is enabled.

Return Rate of Change as Integer
Command: 39, 0x027
Parameter: Scale number
Command 39 returns the current rate of change value for the specified scale. This command is valid only for the 720i, 820i and 920i.

Return Peak as Integer
Command: 40, 0x028
Parameter: Scale number
Command 40 returns the net peak value for the specified scale. This command is valid only for the 520 indicator, and only if the peak hold function is enabled.

Set Batching State
Command: 95, 0x05F
Parameter: State (0 = off; 1 = auto; 2 = manual)
Command 95 sets the batching (BATCHNG) parameter. Indicator status is returned with the current weight for the last scale specified.
Batch Start
Command: 96, 0x060
Parameter: Scale number
Command 96 starts a batch program from the current step after a stop, pause, or reset. Batch status is returned with the current weight for the specified scale.

Batch Pause
Command: 97, 0x061
Parameter: Scale number
Command 97 pauses a batch program at the current step. Batch status is returned with the current weight for the specified scale.

Batch Reset
Command: 98, 0x062
Parameter: Scale number
Command 98 stops a batch program and resets it to the first batch step. Batch status is returned with the current weight for the specified scale.

Batch Status
Command: 99, 0x063
Parameter: Scale number
Command 99 returns the status of a batch. Batch status is returned with the current weight for the specified scale.

Lock Front Panel of Indicator
Command: 112, 0x070
Parameter: Scale number
Command 112 disables all the keys on the front panel of the indicator. Indicator status is returned with the current weight for the specified scale.

Unlock Front Panel of Indicator
Command: 113, 0x071
Parameter: Scale number
Command 113 re-enables all the keys on the front panel of the indicator. Indicator status is returned with the current weight for the specified scale.

Set Digital Output ON
Command: 114, 0x072
Parameter: Slot number
Value: Bit number
Command 114 sets the specified digital output ON (active). Use slot number 0 for onboard digital outputs. Indicator status is returned with the current weight for the last scale specified.

Set Digital Output OFF
Command: 115, 0x073
Parameter: Slot number
Value: Bit number
Command 115 sets the specified digital output OFF (inactive). Use slot number 0 for onboard digital outputs. Indicator status is returned with the current weight for the last scale specified.

Read Digital I/O
Command: 116, 0x074
Parameter: Slot number
Command 116 returns the status for all digital I/O in the specified slot in words 3 and 4 (On the 520, status is returned only for the digital inputs.) Use slot number 0 for onboard digital I/O. Indicator status is returned in the status area for the last scale specified.

User Command Enable
Command: 128, 0x080
Parameter: None
For the 920i only, command 128 enables the BusCommand handler to allow data transfers to the PLC of from 1 to 64 words. When the BusCommand handler is enabled, all discrete transfer commands are disabled and ignored.
Use DisableHandler(BusCommand); in the 920i user program to turn off the BusCommand handler.

No Operation
Command: 253, 0x0FD
Parameter: Scale number
Command 253 provides a command to use between operations, as necessary, without causing the indicator to perform any action. Indicator status and weight for the specified scale is returned.

Reset Indicator
Command: 254, 0x0FE
Parameter: None
Command 254 provides a command to remotely reset the indicator. No data is returned.

Return Status and Current Weight as Float
Command: 256, 0x100
Parameter: Scale number
Command 256 returns the status and weight of the specified scale in floating-point format, without changing the display. This command also causes the format-independent commands to return a value in the floating-point format.
Set Tare as Float
Command: 268, 0x10C
Parameter: Scale number
Value: Tare weight
Command 268 enters a tare for the scale selected in floating-point format. The indicator returns the tare weight as taken, or 0 for no tare.

Read Gross Weight as Float
Command: 288, 0x120
Parameter: Scale number
Command 288 returns the gross weight value for the specified scale in floating-point format.

Read Net Weight as Float
Command: 289, 0x121
Parameter: Scale number
Command 289 returns the net weight value for the specified scale in floating-point format.

Read Tare as Float
Command: 290, 0x122
Parameter: Scale number
Command 290 returns the tare weight value for the specified scale in floating-point format.

Read Piece Count as Float
Command: 291, 0x123
Parameter: Scale number
Command 291 returns the piece count value for the specified scale in floating-point format. This command is only valid for the 520, and only if count mode is enabled.

Read Current Display as Float
Command: 293, 0x125
Parameter: Scale number
Command 293 returns the weight value for the specified scale as currently displayed in floating-point format. This may include gross, net, tare, piece count, rate-of-change, or accumulator values, as enabled. On the 920i, the weight value is returned in the mode used to display a scale widget.

Read Accumulator as Float
Command: 294, 0x126
Parameter: Scale number
Command 294 returns the accumulator value for the specified scale in floating-point format. This command is only valid if the accumulator for the specified scale is enabled.

Read Rate of Change as Float
Command: 295, 0x127
Parameter: Scale number
Command 295 returns the current rate of change value for the specified scale in floating-point format. This command is only valid for the 820i or 920i.

Read Peak Value as Float
Command: 296, 0x128
Parameter: Scale number
Command 296 returns the net peak value for the specified scale in floating-point format. This command is only valid for the 520, and only if the peak hold function is enabled.

Set Setpoint Value as Float
Command: 304, 0x130
Parameter: Setpoint number
Value: Target value
Command 304 sets the target value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a target value.

Set Setpoint Hysteresis as Float
Command: 305, 0x131
Parameter: Setpoint number
Value: Hysteresis value
Command 305 sets the hysteresis value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a hysteresis value.

Set Setpoint Bandwidth as Float
Command: 306, 0x132
Parameter: Setpoint number
Value: Bandwidth value
Command 306 sets the bandwidth value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a bandwidth value.

Set Setpoint Preact as Float
Command: 307, 0x133
Parameter: Setpoint number
Value: Preact value
Command 307 sets the preact value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a preact value.

Read Setpoint Value as Float
Command: 320, 0x140
Parameter: Setpoint number
Command 320 returns the target value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a target value.
Read Setpoint Hysteresis as Float
Command: 321, 0x141
Parameter: Setpoint number
Command 321 returns the hysteresis value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a hysteresis value.

Read Setpoint Bandwidth as Float
Command: 322, 0x142
Parameter: Setpoint number
Command 322 returns the bandwidth value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a bandwidth value.

Read Setpoint Preact as Float
Command: 323, 0x143
Parameter: Setpoint number
Command 323 returns the preact value for the specified setpoint in floating-point format. This command is only valid if the setpoint is enabled and requires a preact value.

Set Register
Command: 368
Registers: 1 thru 256
Command 368 sets register value. 1 through 128 are integer and 129 through 256 are real. This command is only valid for the 720i PCE version.

Get Register
Command: 402
Registers: 1 thru 256
Command 402 returns register value. 1 through 128 are integer and 129 through 256 are real. This command is only valid for the 720i PCE version.
4.1 EDS File

The EDS file for the ControlNet adapter, shown below, is included on the CD that comes with the option. The EDS file must be installed in the host device to enable communication with the indicator.

```
[File]
DescText = "AnyBus-S ControlNet";
CreateDate = 07-19-1999;
CreateTime = 11:11:51;
ModDate = 03-10-2004;
ModTime = 15:00:00;
Revision = 1.7;

[Device]
VendCode = 90;
VendName = "HMS Networks";
ProdType = 12;
ProdTypeStr = "Communication Adapter";
ProdCode = 1;
MajRev = 1;
MinRev = 50;
ProdName = "Anybus-S ControlNet";
Catalog = "Anybus-S ControlNet";

[Device Classification]
Class1 = 1_RSNetWorx_Adapter;
Class2 = ControlNet;

[Port]
Port1 = ControlNet_Redundant,
       "Port A",
       "20 F0 24 01",
       2;

[Params]
Param2 =
  0,                           $ first field shall equal 0
  ,
  ,
  0x0000,                      $ descriptor
  199,                         $ data type : 16-bit Unsigned Integer
  2,                           $ data size in bytes
  "Output Size",
  "",
  "",
  0,450,16,                    $ min,max,default data values
  0,0,0,0,                      $ mult,dev,base,offset scaling not used
  0,0,0,0,                      $ mult,dev,base,offset link not used
  0;                           $ decimal places not used
```
Param3 =
  0,
  
,,
0x0000,
199,
2,
"Input Size",
,,
4,454,20,
0,0,0,0,
0,0,0,0,
0;

[Connection Manager]
Connection1 =
  0x04010002,

$ 0-15 = supported transport classes (class 1)
$ 16 = cyclic (1 = supported)
$ 17 = change of state (0 = not supported)
$ 18 = on demand (0 = not supported)
$ 19-23 = reserved (must be zero)
$ 24-27 = exclusive owner
$ 28-30 = reserved (must be zero)
$ 31 = client 0 (don't care for classes 0 and 1)

0x44240405,

$ point/multicast & priority & realtime format
$ 0 = O=>T fixed (1 = supported)
$ 1 = O=>T variable (0 = not supported)
$ 2 = T=>O fixed (1 = supported)
$ 3 = T=>O variable (0 = not supported)
$ 4-7 = reserved (must be zero)
$ 8-10 = O=>T header (4 byte run/idle)
$ 11 = reserved (must be zero)
$ 12-14 = T=>O header
$ 15 = reserved (must be zero)
$ 16-19 = O=>T point-to-point
$ 20-23 = T=>O multicast
$ 24-27 = O=>T scheduled
$ 28-31 = T=>O scheduled

,,Param2,,

$ O=>T RPI,Size,Format
,,Param3,,

$ T=>O RPI,Size,Format
,,

"Discrete Exclusive Owner",

"20 04 24 01 2C 96 2C 64";

1_PLC5C_RTD_Format1 = 1_PLC5C_1794_Discrete_RTD_Format;
4.2 Configuration Example
The following figure shows an example Scanlist Configuration display for RSNetWorx™. Note that, when configuring the ControlNet adapter, the input size is set to 6, output to 4.
4.3 Ladder Logic Example

The following example shows the ladder logic used to retrieve and swap bytes to load a 4-word package for processing.

- **Load new command**
  - Command for ControlNet: MOV
  - Source: N7:8
  - Dest: 32< N7:2 8192<

- **Swap Command Word**
  - Command for ControlNet: SWP
  - Source: #N7:2
  - Length: 1

- **Send To Scanner**
  - Command to Scanner: MOV
  - Source: N7:2 8192<
  - Dest: O:9.3 8192<

- **Word 1 Input I:9.5**
  - MOV
  - Source: I:9.5 8192<
  - Dest: N7:4 32<

- **Word 2 Input I:9.6**
  - MOV
  - Source: I:9.6 18689<
  - Dest: N7:5 329<

- **Word 3 Input I:9.7**
  - MOV
  - Source: I:9.7 0<
  - Dest: N7:6 0<

- **Word 4 Input I:9.8**
  - MOV
  - Source: I:9.8 4865<
  - Dest: N7:7 275<
4.4 ControlNet Interface Specifications

**Power Requirements**

*Bus Adapter Card with ControlNet Module, DC Power:*

Supply voltage: 6 VDC, supplied by indicator bus

Typical current draw: 350 mA

Power consumption: 2.1 W

*Indicators, Typical AC Load:*

- **520**  
  - Power (TRMS): 3.51 W  
  - Current (TRMS): 33.7 mA

- **820i**  
  - Power (TRMS): 2.18 W  
  - Current (TRMS): 28.9 mA

- **920i**  
  - Power (TRMS): 2.18 W  
  - Current (TRMS): 28.9 mA

**Communications Specifications**

ControlNet RG-6 quad-shielded coaxial cable

Update rate is dependent on the configured baud rate and the number of network nodes. Maximum update rate is 20–24 per second.

**Environmental Specifications**

Temperature: –10° to +40° C (14° to 104° F)

**Conformance**

The ControlNet Interface has been tested for conformance to ControlNet communications adapter profile 12.
ControlNet Interface Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for one year.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, “Protecting Your Components From Static Damage in Shipment,” available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

These warranties exclude all other warranties, expressed or implied, including without limitation warranties of merchantability or fitness for a particular purpose. Neither RLWS nor Distributor will, in any event, be liable for incidental or consequential damages.

RLWS and Buyer agree that RLWS’ sole and exclusive liability hereunder is limited to repair or replacement of such goods. In accepting this warranty, the Buyer waives any and all other claims to warranty.

Should the seller be other than RLWS, the Buyer agrees to look only to the seller for warranty claims.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.
